

#### IV. Remarks

Reconsideration and allowance of the subject application are respectfully requested.

Claims 17-31 and 33-41 are pending in the application. Claims 17, 20, 30, and 31 are independent.

The undersigned would like to thank Examiners Lee and Picard for the cordial and productive interview of May 29, 2003. The Examiners' helpful comments and suggestions were instrumental in preparing this response.

As discussed at the interview, the specification has been amended to correct a clerical error. No new matter has been added.

As discussed at the interview, Applicants have added new dependent Claims 33-41 to afford themselves a scope of protection commensurate with the disclosure. The new claims are fully supported in the specification (see the paragraph bridging pages 12-13 of the specification, and the first full paragraph on page 13), and are believed to be allowable for the reasons to be developed below.

The drawings were objected to for the reasons noted at page 2 of the Office Action. Applicants respectfully traverse this objection. 37 CFR 1.81(a) requires drawings only "where necessary for the understanding of the subject matter sought to be patented." Applicants respectfully submit that the person of ordinary skill in this field readily understands the structure of

"a plurality of molding devices", "a plurality of hydraulic actuators", and "a plurality of valves" in Claims 17-19 without the necessity for a drawing showing such well-known injection molding features. Indeed, the Office Action and cited art make clear that the Examiner fully understands the structure encompassed by this phrase. Note also that plural valves are shown in Fig. 7. Accordingly, Applicants respectfully submit that the drawings are in compliance with 37 CFR 1.81 and 1.83.

Claims 17-30 were rejected under 35 USC 112, second paragraph, for the reasons noted at pages 2-3 of the Office Action. Applicants respectfully traverse this rejection on the ground that the person of ordinary skill in the art would not be confused as to the meaning or scope of the claims. Nevertheless, Claims 20 and 23 have been amended for clarity with respect to the specification and Drawings, and not in response to any statutory requirement.

As discussed at the interview, "Multi-dimensional data" is quite simply a data set, or look-up table, organized in an array structure that corresponds to the variables and resultant of a function that describes the operational characteristics of a device/valve. The data set is stored in the micro-controller memory and may be referenced using known values of the function variables. The data of, either the physical measurements or derivations from known physical laws, are stored and manipulated in a multi-dimensional array to reflect the dependence on a

number of independent variables. In the context of this invention, the flow rate is a function of opening of the valve's orifice, pressure drop across the valve and density of the oil. Operations performed on the multi-dimensional array of data allow the selection of the values of the independent variables (opening of the valve's orifice at a given pressure drop across the valve and the oil's density) to produce the desired functional value (flow rate).

With respect to "by applying an inverse function to the operational data to control for nonlinear characteristics of the hydraulic actuator", Applicants submit that this also is readily understandable to those of skill in this art. Flow rate behaves non-linearly with respect to the opening of the valve's orifice due to variation of pressure drop across the valve. The non-linear behavior of the flow rate can be described adequately by the functional relationship of a sharp edge orifice as shown in equation (4). Since the major contributor of the non-linear behavior is the pressure drop across the valve, selecting an inverse function such as the one shown in equation (8) compensating the pressure drop to a large extent. This inverse function adjusts the control value, calculated based on the operating data, to the correct magnitude in order to compensate the nonlinear behavior.

Simply put, once the value of the required control variable has been established, by means of direct measurement or having been looked-up with reference to the multi-dimensional

data residing in the micro-controller memory, the micro-controller assesses a control signal for a controllable valve that has been corrected to account for the non-linearity of the actuator. The step of assessing the control signal is performed in the micro-controller through the execution of a stored program that includes the step of evaluating the product of an uncompensated control signal value with an inverse to the function that describes the non-linearity of the actuator. This is clearly exemplified with respect to the description of flow rate linearization (column 8 line 64 through column 9 line 64).

Accordingly, Applicants submit that the claims pass muster under 35 USC 112.

Claims 20-21, 24-28, and 31 were rejected as being unpatentable over Arai, for the reasons noted at pages 3-5 of the Office Action. Applicants respectfully traverse all art rejections.

As discussed at the interview, Applicants wish to point out that parent application No. 09/173,732 (now issued as U.S. Patent No. 6,289,259) contains claims which were allowed on the basis, inter alia, that the microcontroller is disposed adjacent at least one of the manifold and the hydraulic actuator (e.g., see Claim 1). Applicants submit herewith a voluntary Terminal Disclaimer with respect to the '259 Patent.

As also discussed at the interview, independent Claim 20 recites a novel combination of structure and/or function whereby the microcontroller is disposed adjacent the manifold.

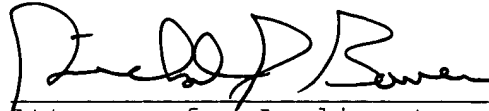
Independent Claim 31 recites a novel combination of structure and/or function whereby the microcontroller is disposed adjacent the valves. See, for example, the first full paragraph on page 13 of the specification which describes that the preferred embodiment locates the microcontroller within 1 meter of the manifold (see also newly-added dependent Claims 37-41). This arrangement allows the manifold and valves to be controlled locally to minimize wiring and to prevent processing bottlenecks in the system controller. Since the manifold and valve are located in areas of high thermal and vibration stresses, it would not have been obvious to locate the microcontroller in such an harsh environment. Arai fails to disclose or suggest that the microcontroller is disposed adjacent the manifold or the valves.

As discussed at the interview, Arai is wholly silent on this point. Absent any teaching regarding the location of the microcontroller, Arai fails to disclose or suggest the salient claimed combination of features set forth in Claims 20 and 31.

In view of the above amendments and remarks, it is believed that this application is now in condition for allowance, and a Notice thereof is respectfully requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 625-3500. All correspondence should continue to be directed to our address given below.

Respectfully submitted,



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